A COMPUTER BASED SOFTWARE FOR HEARING IMPAIRED CHILDREN' S SPEECH TRAINING AND LEARNING BETWEEN TEACHER AND PARENTS IN TAIWAN

Ming-Liang Hsiao, P. T. Li, P. Y. Lin, Shih-Tsang Tang, Tsung-Chieh Lee, Shuenn-Tsong Young

Institute of Biomedical Engineering, National Yang-Ming University, Taiwan

Abstract - **The paper is to design a computer-based software for hearing impaired children's speech training and learning. To use visual assistant method for training and developing the speech ability of hearing impaired children, we used the technique of dynamic computer graphics to establish an animation display system. The system can display the dynamic relation among the basic elements of the articulators. The position and the change of nose chamber, mouth chamber, tongue, and lips during a speech will be shown from different profiles. This makes sure that the subject with hearing impaired children can catch the accurate speech technique. In the future, we will use the network tuition model to assist the special education teachers in their teaching method. Using such an assistant system, we are sure of the improvement of the efficiency and efficacy for developing the language and speech ability of hearing impaired children.**

Keywords - **Hearing Impaired, Exceptional Education, Language Development, Visual assistant**

I. INTRODUCTION

The learning course of language is a continuous progress of practice. The language learning for normal people is naturally, which is spontaneously corporation with hearing-feedback. The normal learning mode is not suitable to the hearing impairers. The hearing impairers are consequently losing the speech ability. Language is the most important social behavior to human being, and it is the most convenient and efficient communication tool. As a result, the researchers continuously devote themselves in developing the special training tools for helping the hearing impairer to learn speech. In the literatures, the most efficiency tools were to use the visual-feedback to replace the hearing-feedback that the hearing impairers lost [1-5].

The language learning is constantly progressing anytime and anywhere for normal person. For the hearing-impaired children, the speech learning is usually limited in special education institutes, and is directed by professionals. The period in the institute is just a little part of their day life. In most time, the children are companioned with their parents who are usually not professionals. The learning course of the children is consequently interrupted, and results in low learning efficiency. In Taiwan, there is severe deficiency in the teaching manpower for the hearing impairers. The learning interruption problem is then especially grave in Taiwan.

The study proposes a teaching assistant system. This is a multifunction assistant system, which is for professional teaching and training, and parent teaching assist. Especially, the system assists the speech education and practice of the hearing-impaired children, when they leave the education institutes. As a result, the problems in manpower deficiency can be reduced, and the interruption problem is solved.

II. METHODOLOGY

The proposed system was developed in personal computer, It was a Mandarin learning assistant system for speech teaching of the hearing impaired children. The two main parts of the system were the vision-feedback and training course.

The vision-feedback was basing on the concept of multimedia, which combined the audio and animation. Corresponding with the word's pronouncing, the side view of speech organs, such as tongue, jaws and lips, and the front-view of mouth sharp all were varied. The combinations of pronounce and animation would make the children realize the complete pronounce progress, the relation positions for each organ, and the differences between different word's pronounce.

The training course included the regular and special course, which all were for the children in different ages. The regular course was arranged in Mandarin 37 phonograms learning for preschool children, and in corresponding with the original school course for elder children. The special course was for usual words and phrases learning. The usual words and phrases were collected in previous, and the special educators arranged the course. All the courses were arranged flexibly, and were dependent e on the children's progress.

III. RESULTS

This study had built the library of speech organ animations of side-view and front-view for the total 37 Mandarin phonograms, full 1347 Mandarin pronounces, and training course. A database was set up for recording the learning course.

When the hearing-impaired children used the system, they usually selected a regular course according with their progress for pronounce practice. The children realized the complete pronounce progress and the related positions of speech organs by inspecting the speech animation from side-view and front-view. Concurrently, the system generated the matching pronounce with the animation, as shown in Fig. 1. The arrangement promoted the children with partial hearing ability to adopt the vision-feedback for assisting the hearing-feedback to increase the learning efficiency.

For bridging the children's learning course in the special education institutes, the system offered a special course, which was for professionals to arrange the children's home practice course, which was shown as Fig. 2. The special course provided the usual words and phrases, which were shown as Fig. 3 and Fig. 4. The professionals liberally arranged the home course according with the children's progress. All the previous courses and children's practice results were recorded for referring.

In the home, the hearing-impaired children could utilize the system to practice pronouncing by themselves, or companioned

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Abstract

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Fig. 1. The frame for pronounce animation

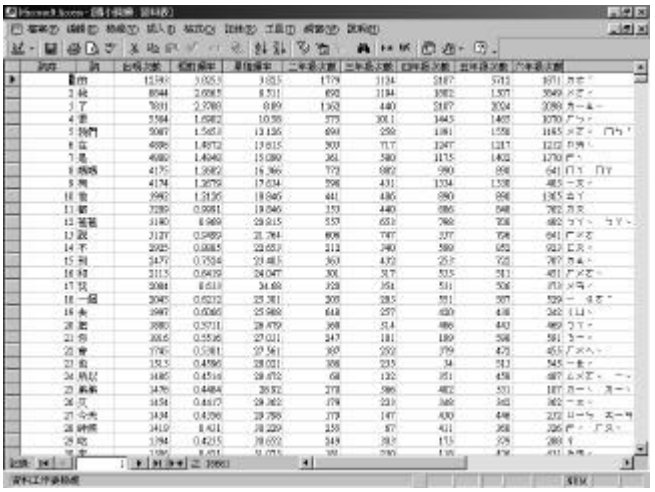

Fig. 3. The usual phrases in primary school

with their parent for help recording their pronounces. A database was employed for logging the full practice progress, and finally concluded a detailed report to the professionals for further education planning.

IV. CONCLUSIONS

The language learning is basing on the continuous practice. This study provides an education assistant system for teaching and home practice. The system overcame the institute obstruction and carried on the speech practice in home. Therefore, the learning efficiency was increased considerably.

The motivation of the current study was to develop an assistant system for facilitating the education and training of special education professionals. In Taiwan, there is severe deficiency in the teaching manpower for the hearing impairers. A network education facility was under developed. The facility will provide the special education professionals to concurrently teach many hearing-impaired children, consequently increase the teaching efficiency. The professional will monitor the practice status and result of individual child by the network, and provide advices one by one. The children will not only to receive the advisor's message, moreover they can directly communicate with advisor if necessary. The future developing system is an interactive system, which will assist the teaching and increase the learning efficiency, and furthermore solve the problem of manpower deficiency.

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Fig. 2. The frame for course browse and arrangement

Fig. 4. The usual words in primary school

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